KINECTIC WAVES AT ART ZOYD STUDIOS

Carl Faia
Art Zoyd
cf@carlfaia.com

Nadia Ratsimandresy
Art Zoyd
nratsimandresy@hotmail.com

Abstract

This paper describes the work in progress of the project undertaken at Art Zoyd Studios to create a new work for Nadia Ratsimandresy and the ondes Martenot (*ondes*)with composer and developer Carl Faia. A brief historical background of the instrument will be given, details of the Max (cycling74) patch will be provided and the directions of development already explored as well as those to possibly be explored. While part of the project is focused on developing the repertoire for the *ondes*, we will present current research and development towards the creation of an augmented instrument allowing the player to expand the playing modes of the unique device and develop an advanced virtuosity by connecting the instrument to the computer, with Max, and using a tracking system combining audio analysis, pitch and amplitude tracking with Max external sigmund~, and visual gestures tracked with the Microsoft Kinect® video camera.

1. INTRODUCTION

Invented in 1928 by Maurice Martenot, the *ondes Martenot* (*ondes*) is one of the first examples of a sound synthesizer. Its unique status - electronic instrument with a strong acoustic element (control of dynamics, phrasing, tuning, timbre, sound diffusion and vibrato) has aroused the interest of many composers. The repertoire has been enriched by more than 2000 musical pieces. From Olivier Messiaen to Tristan Murail, through Darius Milhaud, André Jolivet, Jacques Brel, *Radiohead*, a very large stylistic repertoire has been built.

The instrument is a strange combination and precociously advanced application of traditional playing techniques (with the integration of vibrato through a loosely fitted keyboard) and avant-garde electronic effects (noise generator, random frequency distortions or the unique ring-on-a-string highly accurate pitch controller). Then there is the curious and rich sound diffusion available through the player's ability to change the output timbre through speaker choice and combinations — on the fly! Figure 1 shows the control panel. In fact, there are so many playing techniques and variations, a composer might feel daunted by the sheer number of possibilities the instrument offers and thus prefer to approach the instrument as a novelty or as a "simple" keyboard instrument.

The growing importance of renewing the repertoire, as well as expanding the place of the *ondes* in the contemporary music scene, is, in part, the impetus behind Nadia Ratsimandresy's demand to *Art Zoyd* [1] to have a new look at the instrument and work on developing the repertoire of an instrument on the comeback.

Figure 1. Photo of keyboard and control panel of the *ondes*

While the various parts of the *ondes* are being investigated and experimented with for revision or perfection, the most notable for us is the new speaker, as seen in Figure 2, as both its shape and the various audio connections are unique and convenient for the developments we are currently exploring. Inputs and outputs have been multiplied and we can easily connect and route various audio leads to our interface inputs.

Figure 3 shows the so-called palm speaker – with strings tuned to resonate with the transformer vibrating the wood panels – as yet untouched by Nadia's team, and the "gong" speaker stripped and in the development process. While this is in itself an interesting process and worth further description, this paper will deal with the computer music side of the project. More may be found on further developments in future instalments on the Art Zoyd website.

Figure 2. Photo of new speaker developed for the *ondes* for Nadia Ratsimandresy

Figure 3. Photo of palm speaker and the new gong/reverb diffusion system being created for the *ondes*.

2. THE PATCH

Figure 4 shows a screenshot of the Max patch currently in development for the *ondes* project. The patch itself is often called, The Patch. It is a constantly evolving collection of modules being developed by Carl Faia for both pedagogical and creative ends. The patch is structured around a matrix, or virtual patchbay, used to interconnect everything within the patch. The idea being that anything might be connected to anything else with a click of the mouse, and then saved in a preset for later recall. Of particular interest in this patch is the controller interface being developed, as seen in Figure 5, allowing for any kind of external controller to be input, scaled, smoothed and then sent through remote messages to any module in the patch. Figure 6 shows an example of this. While a simple reverb effect, the parameters are dynamically manipulated through assigned controller numbers (i.e. 1-Ic3 for interface 1, controller 3) thus, potentially, creating a dynamic complex instrument.
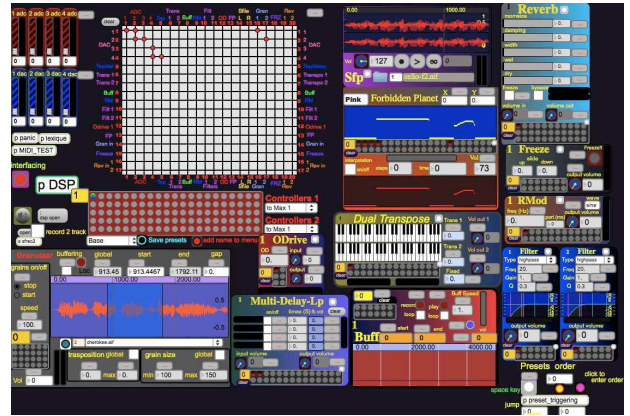

Figure 4. Max patch being developed for the work

Figure 5. Detail of controller interface for the patch

Figure 6. Detail of one effect with controllers assigned in the menus.

3. THE KINECT AT ART ZOYD

Using the Kinect® at Art Zoyd, Figures 7 and 8, started out with composer André Serre-Milan on another project still in progress [2]. Carl Faia started using the video and, more importantly, the skeletal data available from the relatively new, and complicated, process described in many places but nicely outlined in Jon Bellona's white paper on the subject [3]. As usual with any new forms of sensors being hacked or bastardized into processes for which they were not originally meant, there is a period of adaption and the first steps are often extremely basic or clichéd (we saw this with the use of the Wii, but also the joysticks and other game controllers). What became immediately obvious with the Kinect® device was the unprecedented preciseness of the information being delivered (one may easily create a very accurate "theremin").

While all this would be great and fine, there was the problem that getting the system to work reliably and easily was, until recently, not certain. Using this kind of technology might never, indeed, be certain; however there has been a new development that brings it closer to being more certain than before (especially as before, one needed to be running loads of programs through the Terminal on Max OS X). This has come about after the first 2 periods of residence in Art Zoyd Studios so has yet to be explored, but the ease of using the Kinect® in concert is now more probable by the arrival of *Ni mate* [3]. Still in beta, this program, developed by *Delicode*, seems to have solved the major obstacles to using the Kinect® in performance, most notably the ability to automatically find the user and to communicate easily and quickly with Max.

The idea is to have the performer controlling various parameters of the Max patch through the data provided by the Kinect® through *Ni mate* into the controller interface of the patch and then on to the parameters assigned through the menus. All of this data is, at any point along the path, scalable and malleable.
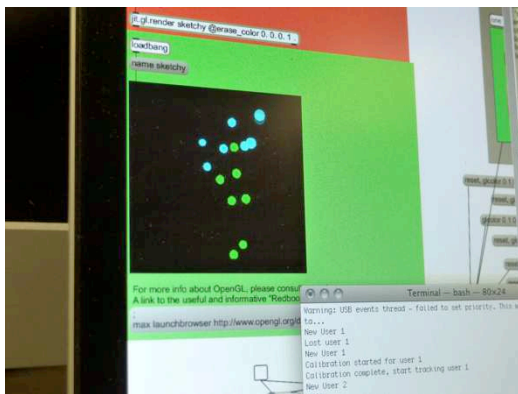

Figure 7. One of the first examples of the Kinect® controlled graphics developed at Art Zoyd Studios.

Figure 8. The Kinect "in use".

4. CONNECTING IT ALL TOGETHER

Technically a flow diagram would have the performer at the top influencing all other parameters. In this project, she will be controlling the sound with her playing of the instrument to produce the raw output, but she will also be controlling the sound through the movement of her body and, in some of our preliminary studies, with the pitch and amplitude of the instrument's analysed raw outputs.

4.1. Analysis with sigmund~

Using the pitch tracker to follow the sinusoidal output of the *ondes* is an obvious use of the instrument's fundamental sound. It is sinusoidal or saw form by choice of the performer. Both are relatively easy to analyse with readily available third party Max objects such as sigmund~ [4]. The pitch and amplitude data can then be used in the same way as any external controller and mapped in through the built in controller of the patch.

4.2. Kinect and the patch

The project, as it is now being formalized, will have a multiform augmented sound-producing element, the *ondes,* capable of creating sound through the various methods related above, as well as through the treatments and/or synthesis of the patch. The use of the analysis of the sound made/played adds a layer of control through analysis to the musical environment, as does the use of motion capture to analyse/recognize and "interpret" the performers movement.

5. CREATING A ONE WOMAN SHOW

We are looking at creating a full length concert/spectacle including a new work written for Nadia and this augmented instrument, a classic arranged for her and this new environment and a work of improvisation created in a collaboration between Ratsimendresy and Faia.

5.1. A new work for the repertoire

The new work will be created from the close collaboration the two musicians have had in the studio. The work will be presented in score form and be of around 15 minutes in duration. The various bits of technology as described above will be used throughout in a creative fashion. As of this writing, live video is planned as an option. Our intention is to create a new work that will be both general for the repertoire of the *ondes*, and playable by other ondistes without too much difficulty in the technological sense, but also particular enough that Nadia's unique approach to the instrument will be preferred and highlighted.

5.2. An old work revisited

As an important part of the project, the classic work by Karlheinz Stockhausen, *Solo for a melodic instrument* (1965-66), will be arranged for the *ondes* by Carl Faia. This is a work he knows well and has already developed with other performers [5] [6]. The patch will have the *Solo* software development integrated into the environment so that the entire system may be included in the finalized version. While this was not an integral part of the project, it has become a fitting inclusion in the collaboration. The openness composed into Solo leaves much to interpretation and the possible effects indicated in the directions are without any real constraints… as if the composer was leaving it all open for these current developments.

6. CONCLUSION

Creating something new for *ondes* is what started this project. We wanted to go further and not only add something to the repertoire but add something new to the instrument itself. While this may or may not be a permanent addition, it does integrate nicely into the overall wish of the performer to reinvent the instrument she is playing and of the composer/developer to augment, through external and internal means — Kinect® and analysis with sigmund~ — the typical solo instrument with electronics piece. In the process, we are both learning how the other works because we are often stuck in the studio together learning how each other's specialized instrument work (the *ondes* and "the patch") and this creates a multi-layered richness to the experience and, in turn, the work tat comes out of this experience. The addition of Stockhausen's *Solo* rounds out the experience and will, we both hope, help instil a creative link back half a century to a certain raw period in the development of electronic music and even further back, nearly a century, to the instrument dreamed up and created by Marice Martinot.

Finally, all this work towards new repertoire, improvisational development, and augmented instruments lies firmly within the stated and implied charter of Art Zoyd Studios since the opening of the studio side of the group in 1997: the development of the

visual element in the spectacle, making new instruments be they virtual or physical (*luthier*), interest and projects based around interfacing the body and/or the instrument with the computer, long term collaborations and a curiosity and knack to bring the old back from limbo and breathe new life into old forms (silent films are an example, but so is the violin-Stroh or the Theremin and the *ondes Martinot* used in concert as if they were just any other instrument) [7].

It is becoming more and more apparent that the Kinect® might very well be the connecting element we've been looking for since many years. With the latest developments in the software integration and the relatively low cost and ease of acquiring the technology, we should be quickly developing new forms of performance practice. The project for *ondes* has been a pivotal experience both for us and, by implication, for other current and future projects in Art Zoyd Studios.

7. REFERENCES

[1] Art Zoyd, Nadia Ratsimendresy & Carl Faia – Residence in October 2011 http://www.artzoyd.net/2011/10/nadia-ratsimendresy-carl-faia-en-residence-en-octobre-2011/?lang=en.

[2] Kinect …ing, video, YouTube, 19 February 2011, viewed 10 March 2012, http://www.youtube.com/watch?v=IAs4VKjvMEo.

[3] Ni Mate, Delicode, http://www.ni-mate.com.

[4] sigmund~, sinusoidal analysis and pitch tracking by Miller Puckette, MSP port by Miller Puckette, Cort Lippe, Ted Apel http://crca.ucsd.edu/~tapel/software.html.

[5] Sluchin, Benny, "A Computer-Assisted Version of Stockhausen's Solo for a Melody Instrument with Feedback", Computer Music Journal, Volume 24, no. 2 (2000): pp 39–46.

[6] Expériences de Vol #8, 2011, audio CD, Orkhêstra International.

[7] The Histroy of Art Zoyd, viewed 10 March 2012, <http://www.artzoyd.net/histoire-art-zoyd>.